

CLMPTO
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CLAIMS 1-17. (CANCELLED)

18. A trench structure in a wafer of semiconductor material, comprising:
- a. a semiconductor wafer having a top surface that has a oxidization rate slower than that of other major crystallographic planes of the semiconductor material;
 - b. a trench structure with substantially vertical trench-sidewalls near the top surface, the vertical trench-sidewalls near the top surface containing crystallographic plane that oxidizes at a rate comparable to that of the top surface; and
 - c. an insulating layer on the top surface and on the trench-sidewalls and on corners where sidewall surfaces approach the top surface, the insulating layer at the corners being substantially thicker than at the sidewall adjacent to the corners; and
 - d. the trench filled with a dielectric material.

19. The trench structure of claim 18, in which the semiconductor material is silicon.
20. The trench structure of claim 19, in which the silicon contains a germanium doped layer near the top surface.
21. The trench structure of claim 20, in which the concentration of the germanium dopant is about 20%.
22. The trench structure of claim 19, in which the top surface contains a (100) crystallographic plane.
23. The trench structure of claim 18, further comprising a pad oxide layer and a nitride layer on the wafer surface.
24. The trench structure of claim 23, in which the pad oxide is approximately 100Å thick and the nitride layer is approximately 1,200Å thick.
25. The trench structure of claim 18, in which the trench pattern comprises a photo-resist pattern.
26. The trench structure of claim 19, in which the top portion of the sidewalls contain {100} planes.
27. The trench structure of claim 18, in which the sidewalls are within 10 degrees to vertical to the top surface.
28. The trench structure of claim 19, in which the corners uncover crystallographic planes other than {100} planes.

29. The trench structure of claim 19, in which the insulating material is silicon dioxide thermally grown on the sidewalls and the top surface.
30. The trench structure of claim 29, in which the grown dioxide at the corners is at least 1.5 times thicker than the grown dioxide layer at the top portion of the sidewalls.
31. The trench structure of claim 29, in which the silicon dioxide is formed at a temperature below 900 °C.
32. The trench structure of claim 29, in which the silicon dioxide is formed at a temperature of approximately 850 °C.